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A POWER-DRIVEN MIXER FOR MAKING OIL EMULSIONS

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Although power-driven mixers suitable for making very small amounts of oil emulsions are on the market, it was found desirable, in making emulsion stock for experimental spraying, to have a mixer with which 2 or 3 gallons could be prepared at one time. The equipment developed for this purpose consists of an electric motor and a mixer head mounted on a 2- by 10-inch dressed pine board 32 inches long, swung in a supporting frame by means of two iron pins so placed that the weight is equal on either side of the pins. The pins act as a pivot, allowing the end of the board on which the agitator and shaft are mounted to be tilted up, as shown in figure 1, and to come to rest against the end-piece when lowered, as shown in figures 2 and 4. By slipping the mixing vessel toward the mixer with the board tilted up, and lowering the agitator and shaft into it at the same time, the equipment is made ready for use (fig. 3). This feature, besides making it possible to place the vessel in position without lifting the entire apparatus, also allows the agitator to be raised and lowered at an angle in the material, providing more efficient mixing. The  $\frac{1}{4}$ -hp. motor has a speed of 1,750 r.p.m. It is mounted by means of four  $\frac{5}{16}$ - by  $2\frac{1}{2}$ -inch bolts in slots so that the belt can be tightened when desired. A  $2\frac{1}{2}$ -inch pulley is mounted on the shaft of the motor.

The mixer head consists of a  $\frac{1}{2}$ -inch pipe 10 inches long, reamed to allow the free passage of a  $\frac{1}{2}$ -inch steel shaft 30 inches long, mounted with a  $2\frac{1}{2}$ -inch pulley and agitator, as shown in figure 4. Brass bushings  $\frac{3}{4}$  inch long are fitted in each end of the pipe to serve as bearings for the  $\frac{1}{2}$ -inch shaft. (Ball or roller bearings may be substituted for these, but are more expensive.) The pipe is welded to a piece of 2-inch angle iron 4 inches long containing two drilled holes for mounting on the board. This is mounted so that the pulley on the motor is centered with the pulley on the shaft. The shaft is held in place with  $\frac{1}{2}$ -inch-wide brass collars and set screws, the collars being placed on the shaft at each end of the pipe. A small grease cup is fitted onto the pipe just under the top bearing and furnishes sufficient lubrication for both bearings, as the pipe can be kept packed with grease.

The agitator is a 4-inch steel disk,  $\frac{3}{16}$  inch thick, with hub and set screw for fitting on the shaft. In order to increase the agitation, the disk contains six  $\frac{1}{2}$ -inch holes reamed at an angle and three crimps equal distances apart (fig. 5). A paddle type of agitator may also be used, and the length and pitch of the blade can be made suitable for the type of agitation desired. The power is transmitted by means of a  $\frac{1}{2}$ -inch V belt.

The frame is constructed of 2- by 2-inch dressed cypress, cut as follows:

Front legs .....	2 pieces, 28 inches long.
Back legs .....	2 pieces, $29\frac{1}{2}$ inches long.
Side pieces, top .....	2 pieces, 14 inches long.
Side pieces, bottom .....	2 pieces, 22 inches long.
Ends, back and front .....	4 pieces, $10\frac{1}{2}$ inches long.

The side and end braces are  $\frac{5}{16}$ -inch iron rods, cut as follows:

Side braces .....	2 pieces, $17\frac{1}{2}$ inches long.
End braces .....	3 pieces, $13\frac{1}{4}$ inches long.

The joints formed by the legs and side pieces are fastened by means of light  $\frac{1}{4}$ - by  $2\frac{1}{2}$ -inch stove bolts. Other joints are fastened with wood screws. One pair of legs is sloped as shown in figure 4 to make the machine stable.

The total cost of the materials, exclusive of labor in assembling the parts, amounted to about \$20.

#### Explanation of Illustrations

Figure 1.--Agitator and shaft in raised position.

Figure 2.--Mixer in normal position.

Figure 3.--Mixer and vessel ready for operation.

Figure 4.--Drawing of side and end views of mixer.

Figure 5.--Details of agitator disk, top and side views.

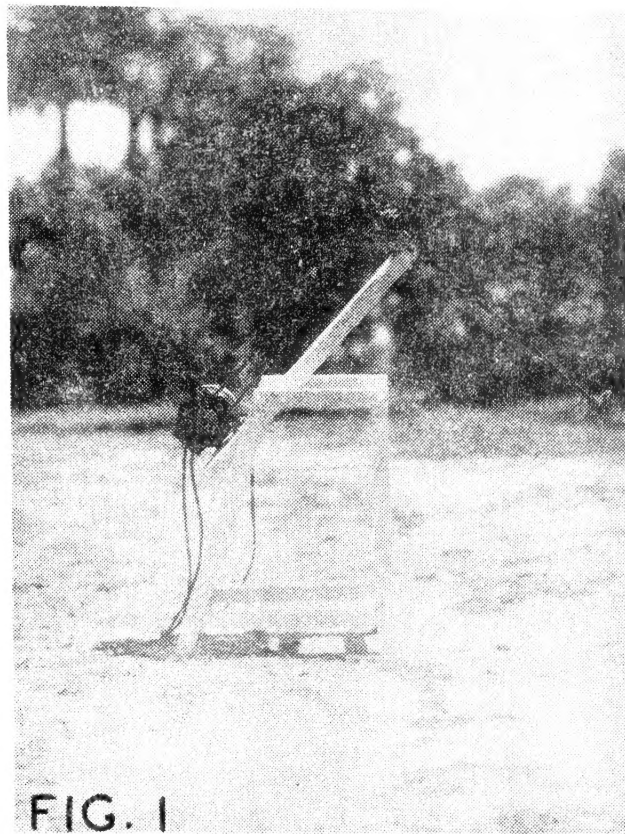


FIG. 1

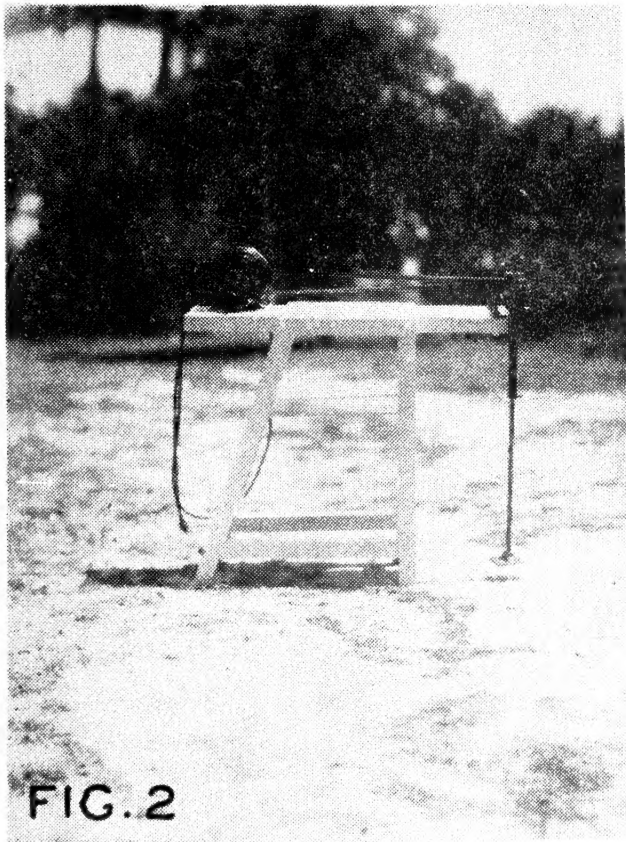


FIG. 2



FIG. 3



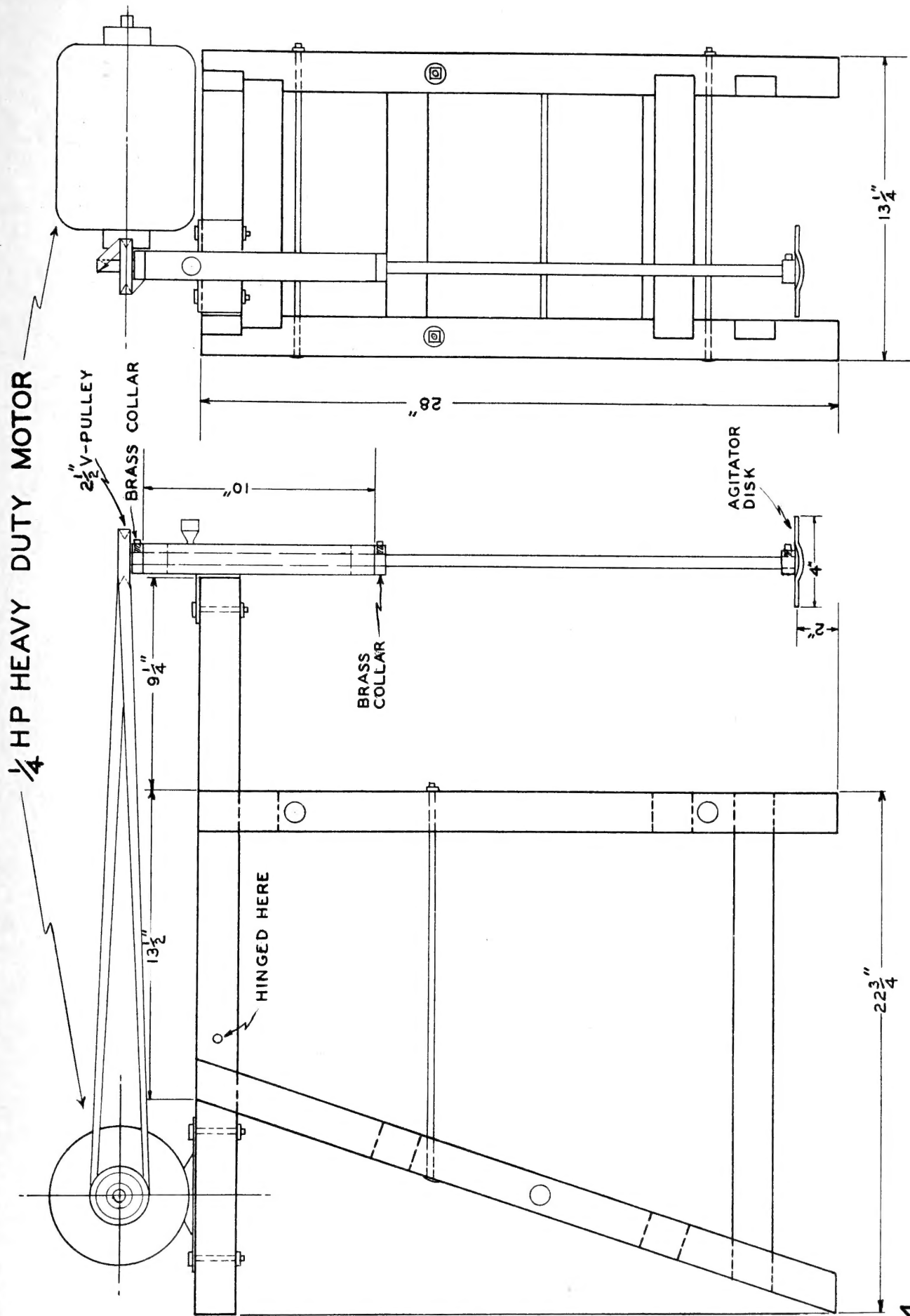


FIG. 4





# AGITATOR

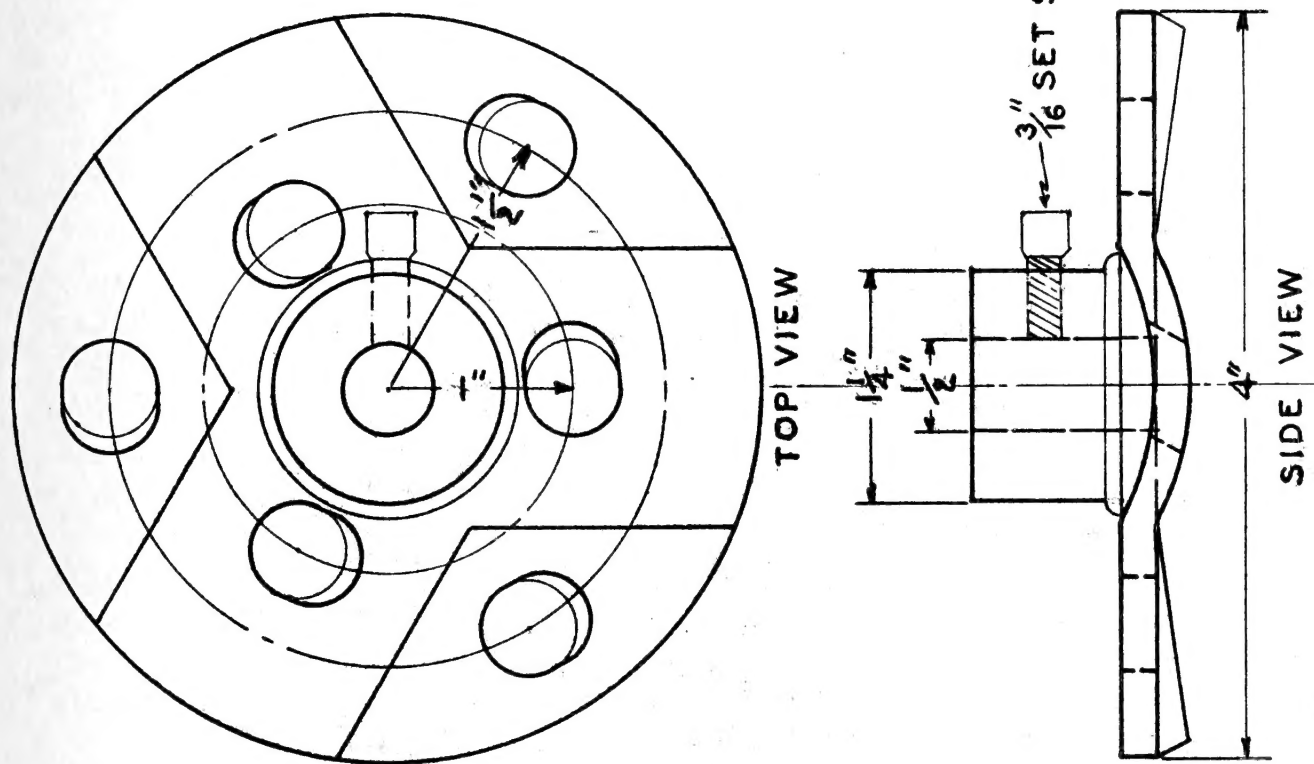


FIG. 5

